Journal of Psychosomatic Research 102 (2017) 1–7

Contents lists available at ScienceDirect

Journal of Psychosomatic Research

journal homepage: www.elsevier.com/locate/jpsychores

Patterns of medical utilization before the first hospitalization for women with anorexia nervosa in Taiwan

Yen-Ni Hung[a], Chian-Jue Kuo[b,c,d], Shu-Yu Yang[b,e], Ming-Chyi Huang[b,c], Ying-Yeh Chen[b,f], Shih-Ku Lin[b,d], Kuan-Yu Chen[b,g,*]

[a] School of Gerontology Health Management & Master Program in Long-term Care, College of Nursing, Taipei Medical University, Taipei, Taiwan
[b] Taipei City Psychiatric Center, Taipei City Hospital, Taipei, Taiwan
[c] Department of Psychiatry, School of Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan
[d] Psychiatric Research Center, Taipei Medical University Hospital, Taipei, Taiwan
[e] College of Medicine, Fu Jen Catholic University, Taipei, Taiwan
[f] Institue of Public Health, School of Medicine, National Yang-Ming University, Taipei, Taiwan
[g] Department of Psychiatry, School of Medicine, National Yang-Ming University, Taipei, Taiwan

ARTICLE INFO

Keywords:
Anorexia nervosa
Female
Medical utilization
Medical expenditure
Taiwan

ABSTRACT

Objective: The aim of this paper was to analyze medical utilization patterns of female patients with anorexia nervosa before their first inpatient care visit for anorexia nervosa using the National Health Insurance Research Database (NHIRD) of Taiwan.

Method: We selected female anorexia nervosa patients (n = 239) and control participants hospitalized for peptic ulcers (n = 478) or appendectomy (n = 478) who were matched by age and incident year from two subsets of the NHIRD. The number of visits, specialists, diagnosis distribution, and selected procedures used in ambulatory services during the 2-year period before the index admission were identified and compared. Healthcare service expenditures were also analyzed.

Results: Compared to the control groups, the female anorexia nervosa patients used more outpatient services (anorexia nervosa, 58.6 ± 45.0 visits; peptic ulcers, 45.3 ± 37.3 visits; appendectomy, 32.5 ± 26.0 visits), mainly due to psychiatric visits. Anorexia nervosa patients were more likely to have received a diagnosis of digestive, endocrine/metabolic, and mental disorders than patients in the control groups. Although nearly equal percentages of patients in the three groups had obtained a diagnosis of a digestive disease, anorexia nervosa patients received digestive disease diagnoses with greater frequency.

Conclusions: We posit that the various physical symptoms of anorexia nervosa patients and physicians' low level of suspicion of anorexia nervosa led to delayed diagnoses and greater medical utilization than that of the controls groups. Education to raise awareness of anorexia nervosa and other eating disorders among physicians is warranted.

1. Introduction

Anorexia nervosa (AN) is a severely debilitating mental disorder. Nonetheless, AN, like other eating disorders, may frequently be untreated for a long time, with one study reporting 4 years on average before it was recognized and treated [1]. A systematic review showed that less than a quarter of people with diagnosable eating disorders in the community seek professional help [2].

Patients with AN may have symptoms related to endocrine [3,4], gastrointestinal (GI) [5,6], and cardiovascular systems [7,8] as well as general symptoms. Because patients with AN may have multiple general symptoms, they may visit medical doctors of various specialties. Studies showed that individuals with eating disorders consulted general practitioners significantly more frequently than controls prior to the diagnosis of the eating disorder, and they rarely received treatment for an eating problem but often received treatment for a general mental health problem and/or weight loss [9,10]. Using electronic medical records of a health maintenance organization, Striegel-Moore and colleagues discovered that the use of health services was significantly elevated in all service sectors among those with an eating disorder compared to matched controls in both the years preceeding and following receipt of an incident eating disorder diagnosis [11]. Another

* Corresponding author at: Department of Psychosomatic Medicine, Taipei City Psychiatric Center, Taipei City Hospital, 309 Sung-Te Road, Taipei 110, Taiwan.
E-mail address: kychen@ms4.hinet.net (K.-Y. Chen).

http://dx.doi.org/10.1016/j.jpsychores.2017.08.014
Received 1 February 2017; Received in revised form 21 August 2017; Accepted 21 August 2017

study demonstrated that healthcare costs were high for patients diagnosed with an eating disorder during the period when the diagnosis was made, and they remained elevated in subsequent years [12].

We found little, if any, research about medical utilization patterns of patients with AN before their first inpatient treatment. The main purpose of this study was to discern medical utilization patterns of women with AN before their first inpatient care for AN by analyzing claims data from Taiwan's National Health Insurance (NHI) program.

2. Methods

2.1. Data sources

The single-payer NHI program was launched in Taiwan on March 1, 1995, and covered nearly 99.9% of the Taiwanese population in 2014 [13]. The database of this program contains registration files and original claims data for reimbursement. The database is managed by the National Health Research Institute, which has established the National Health Insurance Research Database (NHIRD) (http://nhird.nhri.org.tw/en/) to provide data for research purposes. The database includes several data subsets (registration dataset, systematic sampling dataset, the Longitudinal Health Insurance Database [LHID], specific subject datasets, and others).

For this study, we used the Psychiatric Inpatient Medical Claims (PIMC) database and the LHID. The PIMC dataset is composed of patients admitted to the hospital whose admitting department was psychiatric or whose diagnosis was a psychiatric disease (ICD-9: 290 ~ 319) between 1996 and 2007 (N = 187,117). All outpatient and inpatient claim data of these 187,117 individuals between 1996 and 2010 were collected to construct the PIMC dataset. The LHID dataset in this study was the LHID2005, which contains all the original claims data of 1,000,000 beneficiaries enrolled in the year 2005 randomly sampled from the year 2005 Registry of Beneficiaries (ID) of the NHIRD. There are approximately 25.68 million individuals in this registry.

Information that can be used to identify beneficiaries and medical care providers is scrambled by the NHI Administration. All investigators signed an agreement guaranteeing patient confidentiality before using the database. This study was approved by the Institutional Review Board of the Committee on Human Subjects of Taipei City Hospital, Taipei, Taiwan.

2.2. Definition of the Anorexia Nervosa cohort

We retrospectively selected AN patients from the PIMC database. This database was nested within the population of Taiwan (N = about 25 million) and comprised a cohort of patients hospitalized for any psychiatric disorder (ICD-9 codes 290–319) between 1996 and 2007 (n = 187,117). We applied all healthcare claims data covered by the NHI (not only for psychiatric diseases) and submitted to the NHI by the cohort between 1996 and 2010. Based on clinical diagnosis, the psychiatric disorders of each subject were determined.

We included eligible AN participants as study cases from among those who were hospitalized for treatment of AN (ICD-9 code 307.1) for the first time selected from the PIMC dataset between 1998 and 2007. The first-time hospitalization was defined as the index admission. For the analysis of medical utilization in the 2 years preceding the index admission, we did not include those who had hospitalizations in 1996 or 1997 in the cohort. Male participants were excluded because their number was small (n = 64). Fig. 1 shows a flow diagram of participant selection.

2.3. Selection of peptic ulcer and appendectomy control cases

We selected an appropriate comparison group from the LHID2005. We selected patients with peptic ulcer or those requiring appendectomy as the control groups. These comparison groups came from the same source population as the PIMC (the population of Taiwan). There were no statistically significant differences in age, sex, or medical expenditures between patients in the LHID2005 and the original NHIRD (http://nhird.nhri.org.tw/en/Data_Subsets.html). We applied all healthcare claims data of the cohort (1 million beneficiaries in 2005) submitted to the NHI between 1996 and 2010.

For comparability, we selected participants with a peptic ulcer diagnosis (ICD-9 531.xx–534.xx) or undergoing appendectomy (ICD-9 540.xx–542.xx or procedure code = 47.0) requiring hospitalization between 1998 and 2007 from the LHID2005 as the respective primary and secondary control populations. Exclusion criteria included a previous diagnosis of AN, peptic ulcer disease (for the peptic ulcer control group), or an appendectomy (for the appendectomy control group) before the index date, as well as excluding male participants.

We matched cases and controls by age and incident year resulting in a ratio of 1:2 for each patient with AN (n = 239) matched with a primary comparison participant with peptic ulcer (n = 478) and a secondary comparison participant undergoing appendectomy (n = 478), all with similar distributions of baseline characteristics (Table 1).

2.4. Patterns of medical utilization

We investigated healthcare service utilization during the 2-year period before the index admission for AN. We used the outpatient visit data to determine medical utilization patterns. The number of visits, specialists, and the diagnosis distributions were determined. Sonographic, endoscopic, and electrocardiographic (EKG) procedures used in ambulatory services were identified by medical utilization codes.

We accumulated health service expenditures by patient in the 2 years before the index date from the files accounting for ambulatory care expenditures by visit and inpatient expenditures by admission. The NHI reimburses almost all health services (physician, laboratory examinations, diagnostic procedures, medications, surgery, and others). The NHI also sets the payment amount. The value of the expenditures is presented in US dollars at a fixed rate of 30 New Taiwan dollars (NT$) to US$ 1.00. ICD-9_CM was used to categorize diagnoses assigned to the participants, and diagnoses were classified into 19 disease systems. We calculated the number and percentage of participants with a specific diagnosis as well as the mean number of diagnoses given to each patient prior to hospitalization.

In addition to comparisons between the AN and the two control groups, within the AN group, we also compared participants with at least one previous diagnosis of AN in the ambulatory care setting prior to the index admission with those without such a diagnosis. All 255 AN participants were included in this analysis while there were only 239 included in the between-group comparisons because 16 participants were excluded due to a lack of suitable controls.

2.5. Statistical analysis

Demographics and covariates (sex, age, index year, Charlson Comorbidity Index [CCI], employment, hospital level, specialist, and length of stay [LOS]) were tested using a t-test or a Chi-squared test between the AN group and the primary or secondary control group. The CCI evaluates 17 comorbid conditions identified [14] from ICD-9 codes for primary and secondary diagnoses in the NHI claims for both inpatients and outpatients during the 1 year prior to the index date. These ICD-9 codes were used to calculate the Deyo-Charlson comorbidity index [15] categorized as 0, 1, or ≥ 2 comorbid conditions. Statistical analyses were performed using SAS software version 9.1.3 (SAS Institute, Cary, NC, USA). Statistical significance was considered at $p < 0.05$.